

## WHAT IS CLAIMED IS:

1. An analog to digital converter for converting an analog signal into a digital signal, comprising:

5 an input circuit;

a reference circuit for generating a series of reference signals;

a first converter connected to said input circuit and said reference circuit for comparing said input signal to said reference signals for determining the most significant digital values of said input signal; and

10 a second converter connected to said input circuit and said reference circuit and said first converter for comparing said input signal to said reference signals for determining the least significant digital value;

wherein said input circuit includes a sample and hold circuit for storing the input signal;

15 wherein said input circuit includes a sample and hold circuit for storing the input signal during the period said first converter is determining the most significant digital value of said input signal; and

said sample and hold circuit storing the input signal during the period said second converter is determining the least significant digital value of said

20 input signal.

2. An analog to digital converter for converting an analog signal into a digital signal as set forth in claim 1, wherein said reference circuit includes a voltage divider for generating a series of reference signals.

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3. An analog to digital converter for converting an analog signal into a digital signal as set forth in claim 1, wherein said first converter comprises a flash converter for determining the most significant digital value of said input signal.

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4. An analog to digital converter for converting an analog signal into a digital signal as set forth in claim 1, wherein said second converter comprises a charge sharing pipelined chain converter to produce the least significant digital value of said input signal.

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5. An analog to digital converter for converting an analog signal into a digital signal as set forth in claim 1, wherein said first converter determines only the most significant digital value of said input signal; and a second converter determines only the least significant digital value for said most significant digital value determined by said first converter.

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6. An analog to digital converter for converting an analog signal into a digital signal as set forth in claim 1, wherein said first converter determines only the most significant digital value of said input signal; a second converter determines only the least significant digital value for said most significant digital value determined by said first converter; and a multiplicity of said the least significant digital values being equal to one of said most significant digital values.

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- 25 7. An analog to digital converter for converting an analog signal into a digital

signal as set forth in claim 1, including an improved comparator circuit for comparing the input signal to the reference signal.

8. An improved compensation circuit for improving the accuracy of an operating circuit, comprising:

an array of capacitors for generating a variable binary internal signal to provide a wide range of compensation for the operating circuit;

an array of memories;

an array of switches interconnecting said array of capacitors to said array of memories; and

said array of switches interconnecting selective capacitors of said array of capacitors to selected memories of said array of memories for improving the accuracy of an operating circuit.

9. An improved compensation circuit for improving the accuracy of an operating circuit as set forth in claim 17 wherein said compensation circuits compensates for integral non-linearity of the total operating circuit as well as for compensating for differential non-linearity of each component of the total operating circuit.

10. An analog to digital converter for converting an analog signal into a digital signal, comprising:

an input circuit;

a reference circuit for generating a series of reference signals;

a first converter connected to said input circuit and said reference circuit for

comparing said input signal to said reference signals for determining  
the most significant digital values of said input signal; and  
a second converter connected to said input circuit and said reference circuit  
and said first converter for comparing said input signal to said reference  
signals for determining the least significant digital value.

11. An analog to digital converter for converting an analog signal into a digital  
signal as set forth in claim 1, wherein said input circuit includes a  
sample and hold circuit for storing the input signal.

12. An analog to digital converter for converting an analog signal into a digital  
signal as set forth in claim 1, wherein said input circuit includes a  
sample and hold circuit for storing the input signal during the period  
said first converter is determining the most significant digital value of  
said input signal; and

said sample and hold circuit storing the input signal during the period said  
second converter is determining the least significant digital value of said  
input signal.

13. An analog to digital converter for converting an analog signal into a digital  
signal as set forth in claim 1, wherein said reference circuit includes a  
voltage divider for generating a series of reference signals.

14. An analog to digital converter for converting an analog signal into a digital  
signal as set forth in claim 1, wherein said first converter comprises a

flash converter for determining the most significant digital value of said input signal.

15. An analog to digital converter for converting an analog signal into a digital  
5 signal as set forth in claim 1, wherein said second converter comprises  
a charge sharing pipelined chain converter to produce the least  
significant digital value of said input signal.

16. An analog to digital converter for converting an analog signal into a digital  
10 signal as set forth in claim 1, wherein said first converter determines  
only the most significant digital value of said input signal; and  
a second converter determines only the least significant digital value for said  
most significant digital value determined by said first converter.

15 17. An analog to digital converter for converting an analog signal into a digital  
signal as set forth in claim 1, wherein said first converter determines  
only the most significant digital value of said input signal;  
a second converter determines only the least significant digital value for said  
most significant digital value determined by said first converter; and  
20 a multiplicity of said the least significant digital values being equal to one of  
said most significant digital values.

18. An analog to digital converter for converting an analog signal into a digital  
signal as set forth in claim 1, including an improved comparator circuit for comparing  
25 the input signal to the reference signal.

19. An analog to digital converter for converting an analog signal into a digital signal as set forth in claim 1, including an improved digital calibration circuit for improving the accuracy of the analog to digital converter.

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